

2FW AP/2837
[10191/2266]

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of:

Joerg SUTTER et al.

For: ELECTRONICALLY COMMUTABLE
MOTOR HAVING OVERLOAD
PROTECTION

Filed: July 17, 2002

Serial No.: 10/088,270

Confirmation No. 8811

Examiner: Bentsu Ro

Art Unit: 2837

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8/17/2004
AARON C. DEDICH
(33,865)

APPEAL BRIEF TRANSMITTAL

SIR:

Accompanying this Appeal Brief Transmittal is an Appeal Brief pursuant to
37 C.F.R. § 1.192(a) **in triplicate** for filing in the above-identified patent application.

Appellants mailed a Notice Of Appeal on June 18, 2004 from the Final Office Action
mailed by the U.S. Patent and Trademark Office on March 22, 2004. The Notice was filed on
June 21, 2004, so that the two-month appeal brief filing date is August 23, 2004 (since
August 21, 2004 falls on a Saturday). In the Final Office Action, claims 8 to 22 were finally
rejected.

Please charge the appropriate fee of **\$330.00**, which is believed to be the Appeal Brief
fee under 37 C.F.R. § 1.17(e), to Deposit Account No. **11-0600**. The Commissioner is also
authorized, as necessary and/or appropriate, to charge any additional and appropriate fees,
including any Rule 136(a) extension fees, or credit any overpayment to Deposit Account No.
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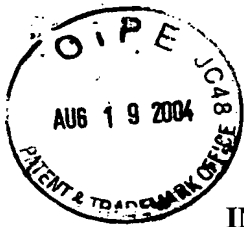
Respectfully submitted,

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[10191/2266]

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Signature: [Signature]

AARON C. DEDICH
(35,865)

APPEAL BRIEF PURSUANT TO 37 C.F.R. § 1.192(a)

SIR:

In the above-identified patent application ("the present application"), Appellants mailed a Notice Of Appeal on June 18, 2004 from the Final Office Action mailed by the U.S. Patent and Trademark Office on March 22, 2004. The Notice was filed on June 21, 2004, so that the two-month appeal brief filing date is August 23, 2004 (since August 21, 2004 falls on a Saturday). In the Final Office Action, claims 8 to 22 were finally rejected.

A Response After A Final Office Action was mailed on May 24, 2004.

An Advisory Action was mailed on June 7, 2004.

In accordance with 37 C.F.R. § 1.192(a), this Appeal Brief is being submitted in triplicate in support of the appeal of the final rejections of claims 8 to 22. It is respectfully submitted that the final rejections of claims 8 to 22 should be reversed for the reasons set forth below.

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1. REAL PARTY IN INTEREST

The real party in interest in the present appeal is Robert Bosch GmbH ("Robert Bosch") of Stuttgart in the Federal Republic of Germany. Robert Bosch is the assignee of the entire right, title and interest in the present application.

2. RELATED APPEALS AND INTERFERENCES

There are no interferences or other appeals related to the present application, which "will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal".

3. STATUS OF CLAIMS

1. Claims 8 to 22 stand rejected under 35 U.S.C. § 102(b) as anticipated by Ogasawara, U.S. Patent No. 5,170,106 (the Ogasawara reference).

4. STATUS OF AMENDMENTS

In response to the Final Office Action mailed on March 22, 2004, Appellants filed a Response After A Final Office Action ("the Response After Final"), which was mailed on May 24, 2004.

5. SUMMARY OF THE INVENTION

The subject matter of the present application is directed to addressing the following problems and/or providing the following benefits.

The present invention is applicable to any an electronically commutable motor whose output stages are controllable by an electronic control unit, using PWM signals, and are feedable from a supply voltage source. (Specification, page 1, lines 2 to 4). The exemplary embodiments of the present invention (and the problem on which they are based) are explained with respect to an electronically commutable motor including electronic components that are limited to the load specified by the nominal voltage and that are protected against overloading even when the supply voltage exceeds the nominal voltage. (Specification, page 1, lines 21 to 24).

According to an exemplary embodiment of the present invention, the pulse width of

the PWM control signals for the output stages may be reduced, at least upon exceeding the motor nominal voltage, to a width that prevents overloading of the motor and electronic components by limiting the motor output, as a function of the magnitude of the supply voltage and the specified setpoint for the PWM control signals. BY influencing the PWM control signals for the motor output stages, the maximum load is defined by the nominal voltage and the maximum setpoint and cannot increase any further even with high supply voltages. The motor and its electronic components are only configured for this load and are protected against overloads. This configuration enables the pulse width to be reduced in such that the pulse width is reduced in linear or nonlinear proportion to the rising supply voltage; however, it is also possible for the pulse width to decrease at an increasing rate with an increasing specified setpoint and rising supply voltage. This latter instance makes use of the fact that a smaller specified setpoint reduces the load on the motor and its components, due to lower currents. (Specification, page 1, line 26 to page 2, line 18).

According to one aspect of an exemplary embodiment of the present invention, the pulse width reduction is incorporated into the control unit. The control unit is assigned a correction unit that forwards, to the motor output stages, the PWM control signals for the motor output stages determined according to the specified setpoint, either unchanged or as reduced PWM control signals, as a function of the magnitude of the supply voltage, and by enabling the PWM control signals for the motor output stages determined by the control unit on the basis of the specified setpoint to be forwarded unchanged to the output stages until the motor nominal voltage is reached, with their pulse width being reduced according to the setting provided by the correction unit only when the supply voltage begins to increase. The correction unit may be integrated into the control unit and the control unit delivers, to the motor end stages, the PWM control signals, either unchanged or with a reduced pulse width, as a function of the magnitude of the supply voltage. (Specification, page 2, line 20 to page 3, line 3).

According to an exemplary embodiment of the present invention, a protective circuit is provided that detects the motor speed instead of the supply voltage and that uses the motor speed to reduce the pulse width of the PWM control signals. Both the supply voltage and the

speed are used to reduce the pulse width of the PWM control signals. (Specification, page 3, lines 5 to 8).

Thus, the present invention is directed to an electronically commutable motor including: output stages feedable from a supply voltage source and an electronic control unit for controlling the output stages using operating PWM control signals, a pulse width of the control signals being reducible as a function of a magnitude of a supply voltage and a specified setpoint such that the motor is protected against overloading, the control signals being determined by a specified operating setpoint up to a nominal voltage of the supply voltage, the pulse width of the control signals being reducible in linear or nonlinear proportion to an increasing supply voltage only upon exceeding the nominal voltage. (See claim 8).

6. ISSUES

1. Under 35 U.S.C. § 102(b) are claims 8 to 22 anticipated by Ogasawara, U.S. Patent No. 5,170,106 (the Ogasawara reference)?

7. GROUPING OF CLAIMS

Issue 1

Group 1: Claims 8 to 22 stand or fall together.

8. ARGUMENT

Claims 8 to 22 are currently pending.

ISSUE 1- Group 1: Claims 8 to 22

With respect to paragraph one (1) of the Final Office Action, claims 8 to 22 were rejected under 35 U.S.C. § 102(b) as anticipated by Ogasawara, U.S. Patent No. 5,170,106 (the Ogasawara reference).

As regards the anticipation rejections of the claims, to reject a claim under 35 U.S.C. § 102(b), the Office must demonstrate that each and every claim feature is identically

described or contained in a single prior art reference. (See *Scripps Clinic & Research Foundation v. Genentech, Inc.*, 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991)). As explained herein, it is respectfully submitted that the Office Action does not meet this standard, for example, as to all of the features of the claims. Still further, not only must each of the claim features be identically described, an anticipatory reference must also enable a person having ordinary skill in the art to practice the claimed subject matter. (See *Akzo, N.V. v. U.S.I.T.C.*, 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986)).

As further regards the anticipation rejections, to the extent that the Office Action may be relying on the inherency doctrine, it is respectfully submitted that to rely on inherency, the Examiner must provide a “basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristics necessarily flows from the teachings of the applied art.” (See M.P.E.P. § 2112; emphasis in original; and see *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Int’f. 1990)). Thus, the M.P.E.P. and the case law make clear that simply because a certain result or characteristic may occur in the prior art does not establish the inherency of that result or characteristic.

Claim 8 provides an electronically commutable motor including output stages feedable from a supply voltage source and an electronic control unit for controlling the output stages using operating PWM control signals, a pulse width of the control signals being reducible as a function of a magnitude of a supply voltage and a specified setpoint such that the motor is protected against overloading, the control signals being determined by a specified operating setpoint up to a nominal voltage of the supply voltage, *the pulse width of the control signals are reducible in linear or nonlinear proportion to an increasing supply voltage only upon exceeding the nominal voltage.* (See claim 8).

In contrast, the Ogasawara reference purportedly concerns a method of protecting a motor and a motor control device against an overload such that an overload state of the motor without an excessive torque applied is detected. Furthermore, the Ogasawara reference states that a voltage of the motor is transform into a rectangular pulse with width that is changeable in a reverse proportion to the motor voltage via use of a chopping wave generator circuit and an operational amplifier. The pulse width is compared with a number of pulses generated

from a rotation sensor which counts the motor revolution, the rectangular pulse and motor revolution pulse are processed through a gate circuit into an overload detection signal by manner of selecting a certain number of the motor revolution pulse only within a range falling in the rectangular pulse width, and the overload detection signal is checked by a central processing unit against a preset value. When a pulse number of the overload detection signal exceeds over the preset value, the supply of voltage to the motor is blocked.

The method of the Ogasawara reference provides that a constant number of pulses are output from the gate circuit as an overload detection signal, irrespective of variations in the motor voltage level, such that the motor torque remains unchangeable at a fixed amount, not amenable to the motor revolution number. At a fixed torque, the overload state of motor is detected such that an amount of torque is set so as to prevent an excessive load from being applied to the motor as well as its associated mechanism and movable members. Furthermore, the Ogasawara reference states that the overload state of motor is determined from the lowering of motor revolution number responsive to the increase of torque and supply of voltage to the motor is not impeded by the over-current detector resistance such that a rated voltage is supplied substantially to the motor so that the motor may operate generally with its original characteristics. (Ogasawara, col. 2, lines 15 to 58).

Accordingly, the Ogasawara reference does not identically describe (or even suggest) each of the features of claim 8, which include the features of an electronic control unit for controlling the output stages using operating PWM control signals, a pulse width of the control signals being reducible as a function of a magnitude of a supply voltage and a specified setpoint such that the motor is protected against overloading, the control signals being determined by a specified operating setpoint up to a nominal voltage of the supply voltage, *in which the pulse width of the control signals is reducible in linear or nonlinear proportion to an increasing supply voltage only upon exceeding the nominal voltage.*

It is submitted that the “analysis” of the Office Actions is incorrect for the following reasons. The first Office Action contends that the CPU (14) shown in Figure 2 of the Ogasawara reference is an “output stage” as in claim 8. (Office Action of Nov. 13, 2003, page 3). It is further asserted that the nominal voltage:

appears to be the Eb1 of Fig. 5; [f]rom Fig. 5, there is no curve showing the PWM control until the motor voltage of Eb1; above Eb1, the PWM is under controlled; thus, Eb1 is equivalent to the minimum point in the chopping wave.

(Office Action of Nov. 13, 2003, page 4)(emphasis added).

The above-quoted (and emphasized) statement contradicts another statement made in the first Office Action that “a specified setpoint can be read onto: (1) the minimum point of the chopping wave generator circuit.” *Id.* at page 3. It is clear from the wording of claim 8 (i.e., “the control signals being determined by a specified operating setpoint up to a nominal voltage of the supply voltage”) that the setpoint and the nominal voltage are not the same parameter. Thus, the first Office Action cannot be correct or consistent when it attempts to equate both of these parameters with the minimum point in the chopping wave.

In addition, the Final Office Action essentially asserts, based on “Ogasawara,” that if the voltage is over Eb1, the applied voltage is pulse-width modulated so that the applied voltage will reduce and the overvoltage or overcurrent will not occur.” (Final Office Action, page 4). However, this assertion is incorrect at least because the pulse width of the signals applied to what the Office Actions refer to as an output stage (i.e., the CPU (14), the equivalence of which is not conceded) is not modulated so that the applied voltage will reduce at the point who the supply voltage is over Eb1.

As may be discerned from a review of Figures 2 and 4 of the Ogasawara reference, the “control signal” that is applied to the CPU (14) is supplied from a gate (50), which, in turn, receives input from a comparator (46) and a rotation sensor (12). While the Ogasawara reference states that “a voltage difference between the chopping wave and reference voltage comes out as a rectangular wave with corresponding width through the comparator” (Ogasawara, col. 4, lines 61 to 64), the output of the comparator is not supplied to the CPU.

In fact, a critical aspect of the Ogasawara reference is that the shortened pulses output from the comparator are matched by the shortened pulses from the rotation sensor, which is discussed as follows:

In the FIG. 4, it can be seen that, in accordance as the motor voltage (Eb) increases, *the number of pulses output from the*

rotation sensor (12) is increased in proportion therewith, thus indicating the decrease in pulse generation period of the motor sensor (12) in a proportion to the increase of motor voltage (Eb).

....

The gate circuit (50) . . . is so arranged as to output a certain number of the above-recited rotation sensor's output pulses in a proportional relation with the above-defined voltage value being set by the comparator (46)(i.e., the width of the rectangular pulse being output from the comparator (46)).

....

With the above-described arrangement, when the motor (M) is applied a load and reduced its revolution number, the period of pulses generated from the rotation sensor (12) is rendered longer. In that case, the pulses of rotation sensor (12) are naturally reduced in number and responsive thereto, **the number of pulses from the gate circuit (50) (i.e. the overload detection signal) is also reduced. If the pulses of the gate circuit (50) identified as the overload detection signal are reduced down below a set value, the CPU (14) determines the motor (M) to be in the state of overload and immediately stop the supply of voltage to the motor (M).** The motor (M) is thus protected against an over-current which is produced in such overload state.

(Ogasawara, col. 5, lines 7 to 57)(emphasis added).

The above-quoted passages clearly indicate that the CPU (i.e., the output stage according to the Office Actions) does not receive a pulse-width modified signal, because this signal is intercepted by the gate (50). In contrast, the output stage receives a count of short, spike-like pulses as shown in Fig. 4. Accordingly, in the Ogasawara reference it is irrelevant if the supply voltage exceeds a nominal voltage value so long as the increased output of rotation sensor is proportional. It is only when they are not proportional -- when the output from the rotation sensor slows due to an applied load -- that the control signal to the output stage changes, and this change is in terms of a pulse count, as opposed to a pulse width. It is therefore respectfully submitted that the Ogasawara reference does not identically disclose or

describe (or even suggest) the feature that the pulse width of the control signals (applied to the output stage) is reducible in linear or nonlinear proportion to an increasing supply voltage upon exceeding the nominal voltage, as in claim 8.

For at least the reasons given above, it is submitted that the Ogasawara reference does not anticipate the subject matter of claim 8, which is therefore allowable. Claims 9 to 22 depend from claim 8, and are therefore allowable for at least the same reasons given above with respect to claim 8.

In summary, it is respectfully submitted that all of claims 8 to 22 of the present application are allowable for the foregoing reasons.

CONCLUSION

In view of the above, it is respectfully requested that the rejections of claims 8 to 22 be reversed, and that these claims be allowed as presented.

Dated: 8/17/2004

Respectfully submitted,

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APPENDIX

1-7. (Canceled)

8. (Previously Presented) An electronically commutable motor comprising:

output stages feedable from a supply voltage source; and

an electronic control unit for controlling the output stages using operating PWM control signals, a pulse width of the control signals being reducible as a function of a magnitude of a supply voltage and a specified setpoint such that the motor is protected against overloading, the control signals being determined by a specified operating setpoint up to a nominal voltage of the supply voltage, the pulse width of the control signals being reducible in linear or nonlinear proportion to an increasing supply voltage only upon exceeding the nominal voltage.

9. (Previously Presented) The motor according to claim 8, wherein the pulse width is reduced at an increasing rate in proportion to an increasing specified setpoint and an increasing supply voltage.

10. (Previously Presented) The motor according to claim 8, further comprising a correction unit assigned to the control unit that delivers, to the output stages, the control signals determined according to the specified setpoint, either unchanged or as reduced control signals, as a function of the magnitude of the supply voltage.

11. (Previously Presented) The motor according to claim 10, wherein the control signals are delivered unchanged to the output stages until reaching the nominal voltage, the pulse width being reduced according to a setting provided by the correction unit only when the supply voltage begins to increase.

12. (Previously Presented) The motor according to claim 10, wherein the correction unit is integrated into the control unit, which delivers the control signals to the output stages, either unchanged or with a reduced pulse width, as a function of the magnitude of the supply voltage.

13. (Previously Presented) The motor according to claim 8, wherein the reduction of the pulse width of the control signals takes place as a function of a speed of the motor.

14. (Previously Presented) The motor according to claim 8, wherein the electronic control unit outputs the PWM controls signals to the output stages.

15. (Previously Presented) The motor according to claim 8, wherein the pulse width of the control signals is reducible in linear proportion.

16. (Previously Presented) The motor according to claim 15, wherein the electronic control unit outputs the PWM controls signals to the output stages.

17. (Previously Presented) The motor according to claim 8, wherein the pulse width of the control signals is reducible in nonlinear proportion.

18. (Previously Presented) The motor according to claim 17, wherein the electronic control unit outputs the PWM controls signals to the output stages.

19. (Previously Presented) The motor according to claim 9, further comprising a correction unit assigned to the control unit that delivers to the output stages the control signals determined according to the specified setpoint as a function of the magnitude of the supply voltage.

20. (Previously Presented) The motor according to claim 19, wherein the control signals are

delivered unchanged to the output stages until reaching the nominal voltage, the pulse width being reduced according to a setting provided by the correction unit only when the supply voltage begins to increase.

21. (Previously Presented) The motor according to claim 19, wherein the correction unit is integrated into the control unit, which delivers the control signals to the output stages as a function of the magnitude of the supply voltage.

22. (Previously Presented) The motor according to claim 9, wherein the reduction of the pulse width of the control signals takes place as a function of a speed of the motor.